

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-35. (Canceled).

36. (Previously Presented) A method of estimating velocity ahead of a drill bit disposed in a subsurface region, comprising:

obtaining surface seismic data for a region of interest using a plurality of surface-located seismic sources and a plurality of surface-located seismic receivers;

during drilling of a borehole traversing the subsurface region, determining a travel time of a seismic wave generated from a surface of the region to a location in the borehole when the drill bit is at selected depths in the borehole;

determining a velocity from the travel time and the selected depths; and

inverting the surface seismic data obtained using the plurality of surface-located seismic sources and receivers to determine a velocity ahead of the drill bit while constraining velocity between the surface and the drill bit to be consistent with the velocity determined from the travel time.

37. (Previously Presented) The method of claim 36, further comprising transforming the velocity ahead of the drill bit into pore pressure of a region ahead of the drill bit.

38. (Previously Presented) The method of claim 36, wherein the seismic wave is generated by a seismic source positioned near an opening of the borehole.

39. (Previously Presented) The method of claim 36, wherein determining the travel time of the seismic wave comprises detecting the seismic wave from at least one seismic receiver at a location in the borehole.

40. (Previously Presented) The method of claim 39, wherein the seismic receiver is disposed in a downhole tool near the drill bit.

41. (Previously Presented) The method of claim 39, wherein determining the travel time further comprises measuring the arrival time of the seismic wave detected at the seismic receiver and determining the travel time from the arrival time.

42. (Previously Presented) The method of claim 41, wherein measuring the arrival time comprises sending the seismic wave detected in the borehole to the surface and processing the detected seismic wave at the surface to determine arrival time.

43. (Previously Presented) The method of claim 41, wherein measuring the arrival time comprises processing the seismic wave detected in the borehole to determine the arrival time and sending the arrival time to the surface via telemetry.

44. (Previously Presented) A method of estimating velocity ahead of a drill bit disposed in a subsurface region, comprising:

generating first seismic waves from a plurality of first seismic sources located at a surface of the region;

obtaining surface seismic data associated with the first seismic waves at a plurality of locations at the surface;

generating second seismic waves from the surface when the drill bit is disposed in the borehole;

obtaining seismic wave data associated with the second seismic waves at one or more locations in the borehole; and

inverting the obtained seismic wave data with the obtained surface seismic data to determine a velocity ahead of the drill bit.

45. (Previously Presented) The method of claim 44, further comprising transforming the determined velocity into pore pressure of the subsurface region.

46. (Previously Presented) The method of claim 45, wherein the surface seismic data is obtained for the subsurface region before the borehole is formed in the region.

47. (Previously Presented) The method of claim 45, wherein the surface seismic data is obtained for the subsurface region after the borehole is formed in the region.

48. (Previously Presented) The method of claim 45, wherein the surface seismic data is obtained for the subsurface region during drilling of the borehole in the region.

49. (Previously Presented) A method of estimating velocity ahead of a drill bit disposed in a subsurface region, comprising:

generating first seismic waves from a plurality of first locations at a surface of the region before the drill bit is drilling subsurface formations in a borehole traversing the subsurface region;

obtaining first seismic data associated with the first seismic waves at a plurality of second locations at the surface of the region before the drill bit is drilling subsurface formations in the borehole;

generating second seismic waves from the surface of the region when the drill bit is drilling subsurface formations in the borehole;

obtaining second seismic data associated with the second seismic waves at one or more locations in the borehole during the drilling; and

inverting the obtained second seismic data with the first seismic data to determine a velocity ahead of the drill bit.

50. (Previously Presented) The method of claim 49, further comprising transforming the determined velocity into pore pressure of the subsurface region.

51. (Previously Presented) The method of claim 49 wherein generating the second seismic waves is performed according to a predetermined sequence and the obtaining the second seismic data is performed correspondingly to the predetermined sequence.

52. (Previously Presented) The method of claim 49 further comprising determining seismic travel time from a position of the generated second seismic waves to the one or more locations in the borehole, the seismic travel time determined by processing the obtained second seismic data in a processor in the borehole.

53. (Previously Presented) The method of claim 49 further comprising determining seismic travel time from a position of the generated second seismic waves to the one or more locations in the borehole, the seismic travel time determined by transmitting detected seismic wave data to the surface from within the borehole.

54. (Previously Presented) The method of claim 36, wherein obtaining surface seismic data using the plurality of surface-located seismic sources and receivers is performed before commencement of drilling of the borehole.